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Social support from friends predicts changes in memory specificity following a stressful life event

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Abstract

Exposure to negative life stress has been associated with difficulty retrieving memories for specific autobiographical events, with important consequences for the emergence of emotional disorders. We examined whether social support can protect against the effects of negative events on memory specificity. University students (N = 143) were assigned to groups based on whether or not they experienced a negative stressor, operationalised as whether or not their recent exam performance was in line with their expectations. After receiving their exam results (T1), and one month later (T2), participants completed measures of memory specificity, their attitudes towards themselves and the occurrence of other stress-related events. Participants also completed a general measure of perceived social support from friends, family, and significant others, and an equivalent measure for social support related to performance. For participants who experienced an exam-related stressor, reduced performance-specific social support from friends was associated with reduced memory specificity at T2, even when accounting for T1 memory specificity, individual differences in attitudes towards self, the experience of additional stressors, and gender. No such relation was present for participants who did not experience a stressor. These findings provide new understanding of the influence of social variables on autobiographical memory specificity.

Keywords: Autobiographical memory; overgeneral memory; memory specificity; social support

Exposure to negative life events has been associated with subsequent difficulty recalling specific memories of past personal events (Barry, Lenaert, Hermans, Raes, & Griffith, 2018; Ono, Devilly, & Shum, 2016). This difficulty has in turn been associated with both the risk for and presence of a range of emotional disorders (Barry, Del Rey, & Ricarte, 2018; Farina, Barry, van Damme, van Hie, & Raes, 2018; Kleim & Ehlers, 2008). Existing research has primarily focused on the *intra*-personal mechanisms through which memory specificity comes to be compromised following negative events (see Williams et al., 2007 for review), with little consideration of the social or *inter*-personal factors that might contribute towards reduced autobiographical memory specificity (rAMS). We present the first investigation of whether the support people perceive that others will give them following the experience of a stressful event can influence the subsequent changes (i.e., reductions) in memory specificity.

Autobiographical memories are those memories which involve personally experienced past events. These memories are classified as specific when they refer to a single event that happened at a place and time within a 24-hour timeframe (e.g., "When I learned that I had failed my chemistry class"); whereas non-specific memories are those which refer to events that occur multiple times (e.g., "Failing college classes"), or over extended periods of time (e.g., "My semester was a disaster"). Difficulty retrieving specific memories has been found among assault survivors with depressive and post-traumatic stress symptoms 2-weeks post-assault compared to survivors with lower emotional distress, and this difficulty has also been associated with a persistence of emotional distress over the next six months (Kleim & Ehlers, 2008). Meta-analyses also confirm that people who are exposed to negative life events show rAMS compared with non-exposed people (Barry, Lenaert, et al., 2018). Other longitudinal studies have also shown that rAMS predicts the course of depressive symptoms over time and is associated with poorer symptomatic outcomes (Liu et al., 2016; Raes et al., 2006) and delayed recovery (Dalgleish, Spinks, Yiend, & Kuyken, 2001; Peeters, Wessel, Merckelbach, & Boon-Vermeeren, 2002). These findings suggest that rAMS is associated

with the experience of negative life events and may confer risk for the subsequent emergence of emotional disorders. Despite these established associations, comparatively little is known about the process by which the experience of negative events leads to rAMS.

The affect-regulation (Williams, 1996) and functional avoidance models of memory retrieval (Williams et al., 2007) propose that when memories for specific events are retrieved, the emotions associated with these events are also elicited. As such, a person might avoid specific memories of stressful past events in order to prevent the re-experiencing of associated negative emotions. Over time, this avoidance and the concomitant prevention of negative emotions is negatively reinforcing and could turn into a more rigid avoidant memory style that is applied to all autobiographical memories. Indeed, correlational research has demonstrated that rAMS is associated with self-reported effortful avoidance of stressful events (Kuyken & Brewin, 1995; Schönfeld & Ehlers, 2006). In subsequent prospective studies, university students who faced performance-related stress and who tended to respond to stressors with cognitive avoidance also retrieved fewer specific memories after the stressor (Debeer et al., 2012; Debeer, Raes, Williams, & Hermans, 2011).

Although there is an association between avoidant coping and rAMS, it is less clear which factors might mitigate avoidant coping, in doing so, mitigate the emergence of rAMS. One such factor could be the support that people receive from others following negative life events and the opportunities this affords them to process these events as well as the negative emotions associated with them (Ehlers & Clark, 2000). When confronted with stressful or unpleasant events, individuals often turn to their social network for help and support. As proposed by the stress buffering hypothesis, social support can benefit a person's overall well-being whilst protecting them against the adverse emotional effects of stressful events (Cohen & Wills, 1985). As such, social support has been shown to benefit both physiological and mental health, and to protect individuals from potential negative outcomes resulting from stress (Brewin, Andrews, & Valentine, 2000; Chu, Saucier, & Hafner, 2010; Kaniasty, 2012;

Taylor, 2011; Wang, Wu, & Liu, 2003). Among university students, perceived social support has been found to act as a buffer against the effects of ongoing stress on well-being (Chao, 2011, 2012). In a diary study, access to social support was associated with reduced experience of physical symptoms such as pain, dizziness, and low energy on high-stress days (Stein & Smith, 2015).

This study built upon the apparent relation of rAMS with exposure to stressful life events and social support, along with the suggestion that rAMS might emerge to help people deal with the negative affect embedded within memories of these stressful events. The goal was to better understand the social factors that might protect people against subsequent reductions in memory specificity. The present investigation therefore examined the influence of social support on memory specificity amongst people who are confronted with a stressor. The experience of a stressor was operationalised in terms of participants' ratings on a scale regarding the extent to which their exam performance was better or worse than they expected. Participants who reported that they did worse than expected were considered to have experienced a stressor, in line with other research in this area (Hermans et al., 2008).

In addition, it is of note that for social support to effectively protect people against the adverse consequences of stress, it has been argued that the type of support (i.e., informational, tangible, emotional, network, or esteem support) should match the individual's needs regarding the particular stressor (Cohen & McKay, 1984; Cutrona & Russell, 1990). While ample research has found evidence for the support-matching hypothesis (Camara, Bacigalupe, & Padilla, 2017; Cutrona, Shaffer, Wesner, & Gardner, 2007; Goldsmith, 2004), knowledge on the importance of whether or not the support has to target the specific stressor is limited. In the area of health psychology, some studies have found that social support addressing a specific health issue such as alcoholism (Beattie & Longabaugh, 1999) or diabetes (Gray, Hoerster, Reiber, Bastian, & Nelson, 2018) is related to better outcomes than more general support. A meta-analysis on work-family conflict shows a stronger protective

relationship from specific support that focuses on work-family balance than general support related to workers' overall well-being (Kossek, Pichler, Bodner, & Hammer, 2011). As such, the present investigation examined whether general or social support directed at performance (i.e., stressor-specific support) would better protect university students from the negative effects of stress and thereby buffer against subsequent decreases in memory specificity one month later.

We expected social support to be related to memory specificity only for those who experienced an exam stressor, and not for those who met or exceeded their exam expectations. We expected stressor-specific support to be more strongly related to changes in memory specificity than general support. These relations between stress, social support and rAMS were expected to be unique even when accounting for the experience of other recent negative life events experienced between assessment times. In addition, we controlled for participants' self-critical view. Such negative attitudes could influence one's views on one's exam performance and memory specificity irrespective of the social support that a person perceives.

Method

Participants

143 students (76% female) from the University of Hong Kong took part in this study. All participants were native Chinese speakers, aged between 17 and 25 (M = 19.55, SD = 1.72). Participants were recruited either on the Participant Pool System of the Department of Psychology at the first authors' university or through advertisements around campus. Participants were compensated either with course credit or with a chance to win one of three cash rewards of five-hundred, three-hundred, or two-hundred Hong Kong dollars.

Measures

Autobiographical Memory Specificity

The written version of the Minimal Instructions Autobiographical Memory Test (MI-AMT; Debeer, Hermans, & Raes, 2009) assessed individual differences in autobiographical memory

specificity. Two separate sets of cues words were used, each with five positive (e.g., satisfied and excited) and five negative cues (e.g., lonely and disappointed), with one set presented at each of the two timepoints. Participants were instructed to write a personal memory in response to each cue word without repeating an event or referring to events from the last seven days. No instructions regarding the events' specificity and no examples were given. The second author was trained to code Chinese responses in the AMT using a pre-coded independent dataset of 100 memories. After this, responses from this study were coded either as specific (a single event which took place at a given time and place that lasted for less than one day), not specific (grouping together the typical codes of categorical, extended and semantic association), or omission when no response was given. The first author cross checked 30% of the coding and interrater agreement was strong (ICC =.82). Disagreements were resolved through discussions. Finally, a proportion score was calculated on the number of specific memories recalled relative to the total number of responses given (the number of cue words minus the number of non-responses).

Perceived Social Support

Two types of perceived social support were measured, namely general support and support specifically targeting performance. Both measures concerned the participants' perceptions of support across time. General support was assessed using the Chinese version of the Multidimensional Scale of Perceived Social Support (MSPSS; Chou, 2000; Zimet, Dahlem, Zimet, & Farley, 1988). Participants rated twelve items from 1 = *very strongly disagree* to 7 = *very strongly agree* (e.g., "My family is willing to help me make decisions" and "I can count on my friends when things go wrong"). Three subscales were calculated to illustrate different sources of support (i.e., significant others, family, and friends). The internal consistency of the MSPSS in our sample (at T1) was high with Cronbach's alpha between .92 and .96 for the subscales. Higher scores indicated higher levels of perceived general social support.

To examine whether there was any evidence of stressor-specific social support, individuals' perceived support around performance was assessed through 11 items adapted from the original MSPSS. Example items include "My family is willing to help me perform better" and "I can count on my friends when my performance does not meet expectations". This adapted scale is referred to as the Multidimensional Scale of Perceived Social Support in Performance (MSPSS-p) and includes subscales for significant others, family, and friends. Participants used the same 7-point scale as in the original MSPSS to rate the items. The internal consistency of the MSPSS-p in our sample (at T1) was high, Cronbach's alpha ranging from .79 to .94 for the subscales. Higher scores reflected higher levels of performance-specific social support.

Impact of Stress-related Events

Individuals' level of stress resulting from recent stressors was measured using the 22-item Chinese version of the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997; Wu & Chan, 2003). Participants were instructed to identify external stressors of any nature between T1 and T2, excluding their academic performances, and to rate the 22 items from 0 = *never* to 4 = *always*. 77 participants at T1 (50% of the stressor group and 60% of the non-stressor group) and 86 at T2 (57% of the stressor group and 66% of the non-stressor group) reported having experienced an external stressor besides their exam results. The IES-R was included both as a dichotomous variable (presence versus absence of additional stressor) and a continuous variable (IES-R total score). The internal consistency of the IES-R total score at both timepoints was good (T1 = .95; T2 = .97). Higher scores indicated higher level of subjective stress resulting from the identified event.

Attitudes Towards Self

The Attitudes Toward Self-Revised (ATS-R; Carver, la Voie, Kuhl, & Ganellen, 1988) measured individual differences in cognitive tendencies that make people more vulnerable to depression, namely holding overly high standards (e.g., "I set higher goals for myself than

other people seem to"), being self-critical in the face of failure (e.g., "I get unhappy with anything less than what I expected of myself"), and generalizing one failure to a broader sense of self-worth (e.g., "A single failure can change me from feeling OK to seeing only the bad in myself"). Participants rated 10 items from 1 (*I agree a lot*) to 5 (*I disagree a lot*). The internal consistency of the ATS-R in our sample (at T1) was adequate (α = .88). Lower scores indicated more negative attitudes towards the self.

Procedure

The procedure was approved by the ethical committee at the University of Hong Kong (EA1708019).

Self-report data were collected online at two different timepoints. The first was conducted within seven days of participants receiving their midterm results (T1) and the second (T2) occurred one month later. At T1, after giving consent, participants provided demographic information and filled out each of the measures. They also answered a question regarding the extent to which their midterm results met their expectations. Specifically, participants were asked to rate on a scale from -5 (way below expectations) to +5 (way above expectations) regarding the extent to which their midterm results were in line with their expectations. In line with the procedure of Hermans et al. (2008), participants with a negative score were considered to have experienced an academic stressor ('stressor group') and the others either met or exceeded their expectations ('non-stressor group'). At T2, participants received an email with the link to the same set of measures, with the exception of the exam performance question, and were asked to fill them out within seven days.

Analysis strategy

Analyses were conducted using R Statistical Software (version 3.5.1). First, between-group (stressor group vs. non-stressor group) differences were examined for each study variable. No between-group difference was anticipated, as any effect of exam stressor exposure on AMS was only expected amongst people who, in addition to the exam stressor also experienced

low social support. As our hypotheses were that social support would influence specificity for people who experienced an exam stressor, but not other participants, we subsequently calculated, within each group, correlations between our study variables and potential covariates (e.g., age) and examined gender differences between these variables. In case of evidence of a significant correlation between any of the social support variables and specificity within either of the groups, we followed this up with regression analyses for that particular group. If there had been evidence of a correlation across both groups, then a sample-wide regression analysis would have been performed. These regression analyses examined whether the relation between perceived social support at T1 and memory specificity at T2 that was observed in the correlation analysis persisted while accounting for potential covariates. Only the binary score (presence versus absence of additional stressor) from the IES-R was used in the regression analyses as not all participants experienced a significant non-academic stressor between assessment times, as reported below.

Results

Between-group analyses

The proportion of participants' reports of the presence or absence of non-academic stressors was the same between the stressor and the non-stressor groups at T2, $\chi^2(1) = 0.86$, $p = .353$, $V = .08$. The two groups also did not differ in the proportion of female participants, $\chi^2(1) = 0.35$, $p = .553$, $V = .05$.

Table 1 presents between-group analyses between the stressor group and the non-stressor group for each study variable. There are no group differences in memory specificity at either timepoint. In addition, the two groups did not differ in attitudes towards self, general social support, and performance support in T1, or impact of non-academic stressors in T2. Participants in the non-stressor group were significantly older than those in the stressor group, $t(141) = 2.25$, $p = .026$, $d = .39$.

Within-group analyses

Stressor group

Within the stressor group, there were gender differences in general support from family, $t(88) = -2.12$, $p = .037$, $d = .51$, and from significant others, $t(88) = -2.19$, $p = .031$, $d = .52$, as well as performance support from significant others, $t(88) = -2.85$, $p = .005$, $d = .68$, such that female participants reported higher levels of perceived support from each of these sources compared to male participants. There were no significant differences between male and female participants within the stressor group for social support from other sources, with general support from friends indicating the largest difference, $t(88) = -1.88$, $p = .063$, $d = .45$. Memory specificity in T2, $t(88) = .60$, $p = .550$, $d = .14$, attitudes towards self in T1, $t(88) = .26$, $p = .792$, $d = .06$, and impact of non-academic stressors in T2, $t(58) = .796$, $p = .429$, $d = .24$, also did not differ between the two genders within the stressor group.

Table 2 provides an overview of the correlational findings. Within the stressor group, age was not related to memory specificity, social support, attitude towards self or impact of non-academic stressors. Memory specificity in T1 and T2 were significantly correlated ($r = .47$, $p < .001$). Attitude towards self was significantly related to impact from non-performance stressor ($r = -.26$, $p = .046$). Results confirmed the crucial hypothesis that social support was related to memory specificity, with greater perceived performance support from friends at T1 associated with greater memory specificity at T2 ($r = .23$, $p = .026$; see Figure 1) but not with memory specificity at T1 ($r = -.01$, $p = .934$). Other sources of perceived general support or performance support were not related to memory specificity at either timepoint.

Non-stressor group

Within the non-stressor group, female participants reported higher levels of general support from significant others when compared to male participants, $t(51) = -2.35$, $p = .022$, $d = .80$. There were no gender differences in social support from other sources, with performance support from significant others indicating the strongest difference, $t(51) = -1.89$,

p = .064, d = .64. Memory specificity in T2, $t(51) = 1.10$, p = .277, d = .37, attitudes towards self in T1, $t(51) = -.73$, p = .472, d = .25, and impact of non-academic stressors in T2, $t(38)$ = .304, p = .763, d = .12, also did not differ between male and female participants within the non-stressor group.

As shown in Table 2, within the non-stressor group, age was not related to any of our study variables. Memory specificity in T1 and T2 were significantly correlated (r = .56, $p <$ .001). Neither perceived general support nor performance support from any sources was related to memory specificity in T2 (see Table 2 and Figure 1).

To summarise, greater perceived social support from friends related to performance was associated with enhanced specificity a month later for people who experienced an exam-related stressor. There was no such relation for general support, or performance support given by families or significant others. Furthermore, there was a significant relation between social support and specificity only for participants who reported experiencing an academic stressor. These variables were not related for participants who were not confronted with an academic stressor. Nevertheless, the strength of the correlations between social support and memory specificity did not differ significantly between the stressor and non-stressor groups, z = .92, p = .36. We then performed a linear regression predicting T2 memory specificity in order to examine the extent to which, within the stressor group, the relation with T1 performance-related social support from friends was independent of gender, the occurrence of the presence of other stressors that occurred between T1 and T2, and participants' individual differences in negative attitudes themselves. As there were no significant correlations with age, this variable was not included in the regression analyses.

T1 memory specificity, B = .452, SE = .088, $p < .001$, the presence of non-academic stressors between T1 and T2, B = .204, SE = .043, p = .026, and T1 perceived performance support from friends, B = .262, SE = .019, p = .005, each predicted significant unique variance in T2 memory specificity. Participants' attitudes towards themselves, B = -.025, SE

= .003, p = .784, and gender, B = -.132, SE = .048, p = .145 did not predict a significant amount of variance. This model explained 30% of the variance in T2 memory specificity, $F(5, 84) = 8.55$, $p < .001$. Amongst participants who experienced an exam-related stressor, those who perceived that they had greater social support from their friends at the time of their exam results showed greater memory specificity a month later. This relationship was independent of specificity measured at the time of the exam results, and individual differences in attitudes towards the self and the experience of additional stressors. Also, only social support that was stressor-specific predicted memory specificity a month later, rather than more general support that one receives more regularly.

Discussion

Although difficulty retrieving specific autobiographical memories has been associated with exposure to life stressors (Barry, Lenaert, et al., 2018; Ono et al., 2016) and social support has been found to protect people from the negative psychological consequences of such exposure (Brewin et al., 2000; Chu et al., 2010; Kaniasty, 2012; Taylor, 2011; Wang et al., 2003), no study has hitherto explored the relation between exposure to life stress, social support and subsequent problems with memory specificity. Our study showed that among students who perceived their exam results as not meeting their expectations, social support from their friends related to performance (i.e. stressor-specific support) was associated with more specific memory retrieval one month later, even when accounting for specificity measured at the time of the exam results, individual differences in attitudes towards the self, the experience of additional stressors, and gender.

These findings add to current knowledge on the mechanisms that underlie rAMS and they expand the traditional focus from intrapersonal processes (Williams et al., 2007) to better capture the social, interpersonal, processes that might influence memory specificity and its association with emotional disorders. Our findings suggest that after significant life events, individuals who perceive that they can access good social support, and particularly

that which is relevant to the stressor that they experienced, are less likely to experience subsequent problems with memory specificity that might otherwise be expected (Barry, Lenaert, et al., 2018). Our findings are also in line with an observed trend that people retrieved more specific memories when they received support following emotional abuse as compared to those without any support (Raes, Hermans, Williams, & Eelen, 2005). It could be that the support received allows individuals to process the negative events and to cope with any negative affect, which then preserves their ability to retrieve specific memories, reduces their need for subsequent functional avoidance, and protects them from the risk of subsequent emotional disorder (Kleim & Ehlers, 2008). Future research must now examine the buffering effects of social support following more significant life stressors than exam failure, such as physical or sexual traumas, and further decipher the underlying cognitive mechanisms that might account for the protection against reduced specificity and in doing so, subsequent depressive or post-traumatic stress symptoms.

In the present study, perceived support was positively related to memory specificity only when people had experienced a stressor. This finding parallels past research where the association between rAMS and individual differences in affect-regulation was only present in distressing situations (Hermans et al., 2008; Raes, Hermans, De Decker, Eelen, & Williams, 2003). It may be that social support enables people to better process the negative events that they have recently experienced. According to literature on the social sharing of emotions (for a review see Rimé, 2009), people are naturally inclined to narrate their experiences with others and this has effects on the way that people cope with the emotions associated with these events. When the emotions attached to the memories are negative, they are found to fade faster than if they are positive (the fading affect bias; see Walker & Skowronski, 2009 for review). It seems that in retelling the event, individuals have the opportunity to regulate the negative affect that this evokes. This may in turn reduce the need for the person to use cognitive avoidance strategies to cope and facilitate the elaboration and integration of the

event memory (Ehlers & Clark, 2000). Conversely, people who perceive social support to be poor at the time of a stressful event may experience greater negative affect and so may be more likely to use cognitive techniques such as avoidance to prevent the re-experiencing of this negative emotionality. In accordance with the functional avoidance hypotheses of Williams et al. (2007) this avoidant coping might compromise the retrieval of specific memories more generally.

Although this explanation is plausible, the present investigation did not directly examine the exact cognitive mechanisms at play. Future investigations could use experience sampling technology to record the amount and quality of support received, to track changes in affect, and to ask whether participants are thinking and talking about the stressor at various moments between T1 and T2. Examining individual differences in the fluctuation of support received, the psychological impact of the stressor, and the cognitive processes that underlie this, will help build a more comprehensive picture of the effects of stress, affect, and social support on memory specificity.

Importantly, the present investigation also found that the relation between perceived support and memory specificity was distinctive to support directed at the stressor rather than more general dimensions of social support. This is in line with existing research that has shown better outcomes, including higher proportion of days abstaining from alcohol, better adherence to diabetes-specific diets, and reduced work-family conflict when social support is targeted at these specific negative or distressing circumstances (Beattie & Longabaugh, 1999; Gray et al., 2018; Kossek et al., 2011). This finding also relates to the optimal-matching theory which argues that the most effective social support is that which matches the nature of the stressor (Cutrona & Russell, 1990). Although the optimal-matching theory emphasizes the type of support offered or received (i.e., emotional, informational, network, tangible, and esteem support), our findings additionally suggest that whether or not the support that is offered is specific to a stressor is also important. In receiving stressor-specific support, the

individual may be better at evaluating and solving the problem at hand, enhancing self-efficacy and reducing distress. While our findings suggest that stressor-specific support might be particularly beneficial, it remains unclear which type(s) of support can further enhance these protective effects against stress. Future investigations are needed to compare the different types of stressor-specific support (e.g., informational versus esteem support on performance, emotional versus network support on loss and grief etc) in protecting individuals' memory specificity.

Our finding that social support from friends, but not from family or significant others, was associated with memory specificity is also of interest. Other studies examining the relations between social support from different people and academic stress have reported mixed findings in this regard. Our findings are in agreement with those of one study that showed that support from friends, but not significant others or family members, predicted greater emotional resilience amongst students who were experiencing academic stress (Wilks, 2008). Another study examined a wider range of support sources (i.e., significant others, family, friends, parent, sibling, and college friends) and found that only perceived support from significant others was significantly related to individual differences in academic-related stress (Renk & Smith, 2007). Parental or familial support appears to relate more to students' academic achievement such as their grade point average rather than the stress they experience in academia (Cheng, Ickes, & Verhofstadt, 2012; Cutrona, Cole, Colangelo, Assouline, & Russell, 1994). It may be that parents provide the initial foundation for students' academic performance but when students are confronted with academic-related stress, they find support from friends more effective, which then protects them from the reduction of memory specificity. Also as suggested by social affiliation theory (Schachter, 1959), perhaps individuals are simply more drawn to talk to their peers who are or have been in a similar situation. It could also be that social support from parents in response to academic stressors is less variable, with most people receiving the support that they need. However, support from

friends may be more variable, either because friends are distracted by their own academic stress or because some participants may be reluctant to discuss their academic failings with peers that they perceive as competitors, even if these friends are generally supportive. Future research must examine the nature of support as it is given, and explore in what way support from friends is sought or is given following an academic stressor, compared to support from family members.

It is also possible that memory specificity in turn influences whether people seek social support, and the amount and quality of support they receive, resulting in a bidirectional relation between support and specificity. It has been suggested that individuals who lack memory specificity on a more severe level are less likely to seek treatment (Raes et al., 2005), and to report less social support in the following year (Barry et al., 2019). Besides, the sharing of personal past experiences has been theorized to serve several social functions, namely developing intimate relationships, informing or advising others, and eliciting or showing empathy and reassurance (Alea & Bluck, 2003). Research has shown that recalling past personal events is related to enhanced warmth and closeness between pairs of people (Alea & Bluck, 2007; Beike, Brandon, & Cole, 2016). It has been suggested that disclosure about the self and social support reinforce each other (Chaudoir & Fisher, 2010). As such, perceived social support has been found to predict the extent to which unpleasant events were disclosed (Kahn & Cantwell, 2017) and disclosing personally distressing information has been found to be positively related to perceived social support at the time of a stressor (Kahn, Achter, & Shambaugh, 2001) and two months later (Kahn & Hessling, 2001). It could be that during the interaction between sharer and listener, the intimacy and support experienced help increase the sharer's memory specificity, and simultaneously, when the memories being retrieved are more specific, the quality of support provided by the listener is then enhanced.

Surprisingly, participants' attitude towards themselves was related only to the impact of non-performance stressors measured using the IES-R. In particular, the more negative

attitudes one has towards self, the higher the level of subjective stress experienced from external stressors. The ATS measure was solely focused on one's view of self but it could be that within a social context, people's attitudes regarding how they would like to be viewed by others and their fears of being negatively evaluated could play an important role in determining the impact of a performance-related stressor and also the effects of social support on the way that they cope with this stressor. Future research could explore this possibility using more socially oriented measures of negative attitudes to better capture its effect on social support and memory specificity.

There were a number of limitations in this study that should be noted. First, the presence of an academic stressor was measured through participants' self-report of whether their midterm results were in line with their expectations. This was based on the assumption that the greater the discrepancy between expectations and outcome, the more distress one would experience. This approach replicates that of Hermans et al. (2008). However, this single measure might not be the most accurate portrayal of students' emotional response to their academic results. Although research with more potent stressors is warranted, future research replications of the present design could incorporate a more precise measure of participants' level of distress. With regard to our social support measure, while the revised MSPSS-p captured social support related to performance, it was not specific to academic results. When creating the MSPSS-p, we intended to create a measure that assesses support for all kinds of performance as we hypothesized that support related to performance as a whole would differ from the broader kind of socioemotional support that people typically receive. The measure does not differentiate between different kinds of performance (e.g., academia versus sports). However, it could be that people perceive more or less support based on different forms of performance. As mentioned previously, the use of experience sampling could overcome this limitation by observing the kinds of support people are actually receiving following stressors and its influence over memory specificity. Future

research could also compare the relations between social support and memory specificity following two different performance stressors (e.g., failed exam versus competition loss). Another limitation concerned the large number of significance tests in the correlation analyses without correcting for multiple comparisons. However, our a priori hypotheses were concerned only with the correlations including the AMT and social support. Other correlations were reported in the interests of transparency and to increase the ease with which our data might be used in meta-analyses. It is of note that previous results in this area (Barry et al., 2019) also reported the same pattern of correlations with social support given by friends, compared to other groups. In addition, the difference found between the stressor and non-stressor groups was relatively small and non-significant. Future studies, perhaps with more potent stressors, must replicate our findings using a larger sample size and a more precise measure of distress level to categorize the stressor and non-stressor groups. Lastly, it is important to note that the extent to which a person can recall a specific memory says nothing about the accuracy of the memory that is recalled. Memories can be distorted or biased due to factors such as the experience of highly stressful or emotional events (Schwabe & Wolf, 2010), ruminative processes (Small, Kenny, & Bryant, 2011), and interpersonal discussions (Soleti, Wright, & Curci, 2017). Future research could examine the effects of social support following negative life events on other memory-related qualities, such as memory accuracy or coherence.

In summary, the findings presented here correspond to a growing body of research regarding the social processes that influence, and are influenced by, autobiographical memory. The findings presented here suggest that research must move beyond examining the intra-personal factors that cause problems with autobiographical memory specificity (Williams et al., 2007) to examining the inter-persona factors that can enhance or diminish memory specificity. The findings presented here provide the first evidence that social processes and in particular the support people perceive that others will give them following a

stressful life event, might also play an important role in how people cope with these events and how good social support might mitigate the effects of these events on their autobiographical memory specificity. Future investigations are needed to replicate the buffering effects of social support on memory specificity amongst people exposed to more potent stressors and to understand how the social sharing of memories and emotions enhance the coping of these stressors.

Disclosure statement

The authors have no conflicts of interest to declare.

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Table 1. Between-group comparisons for each study variable

	Stressor group		*Non-stressor group*		*Independent t-test*			
	M	*SD*	*M*	*SD*	*df*	*t*	*p*	*d*
AMT (T1)	.41	.24	.45	.26	141	.86	.389	.15
AMT (T2)	.31	.24	.35	.26	141	.92	.358	.16
Age	19.30	1.48	19.96	2.02	141	2.25	.026	.39
ATS (T1)	29.78	8.36	30.94	8.54	141	.80	.426	.14
IES-R (T2)	3.44	3.31	4.52	2.81	98	1.70	.093	.35
MSPSS sig. other (T1)	4.82	1.63	4.94	1.74	141	.41	.680	.07
MSPSS family (T1)	5.03	1.35	4.98	1.39	141	-.22	.826	.04
MSPSS friends (T1)	5.21	1.17	5.28	1.39	141	.32	.751	.05
MSPSS-p sig. other (T1)	4.97	1.58	4.85	1.90	141	-.40	.691	.07
MSPSS-p family (T1)	4.74	1.40	4.69	1.47	141	-.23	.822	.04
MSPSS-p friends (T1)	5.08	1.09	4.92	1.38	141	-.74	.459	.13

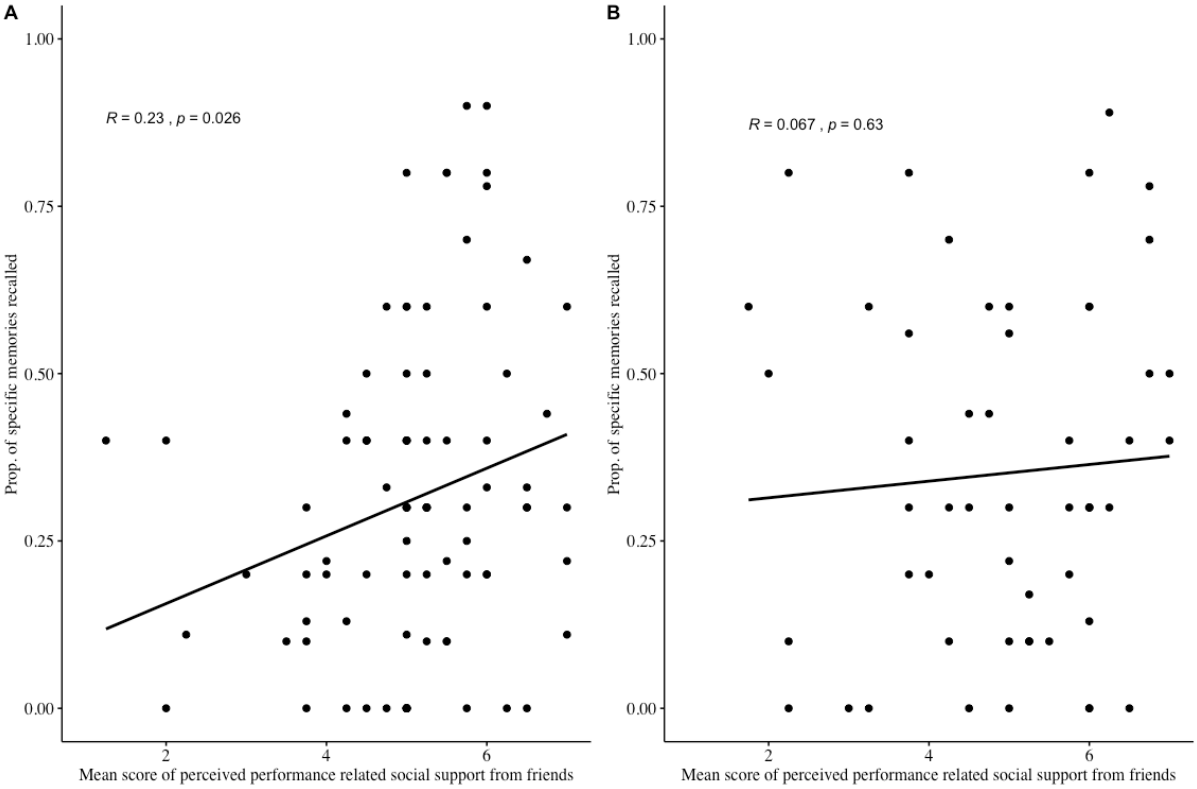
Note: Independent t-tests comparing between the stressor group (n = 90) and the non-stressor group (n = 53) on mean of Autobiographical Memory Test (AMT) in T1 and T2, the Attitudes Toward Self (ATS), the Multidimensional Scale of Perceived Social Support (MSPSS), and the Multidimensional Scale of Perceived Social Support in Performance (MSPSSp) in T1, and the Impact of Event Scale-Revised (IES-R) in T2.

Table 2. Within-group correlations for each study variable

	1	2	3	4	5	6	7	8	9	10	11
1. AMT (T2)	-	.47***	.01	-.07	.01	-.03	-.01	.03	-.07	.10	.23*
2. AMT (T1)	.56***	-	.08	-.10	-.05	-.16	-.18	-.13	-.12	-.09	-.01
3. Age	.21	.14	-	.17	-.17	.00	.19	.00	-.05	.03	-.05
4. ATS (T1)	.11	.05	.06	-	-.26*	-.07	.08	.00	-.10	.01	-.07
5. IES-R (T2)	.11	.02	.27	-.12	-	-.07	-.30*	-.33**	-.05	-.14	-.16
6. MSPSS sig. other (T1)	.14	.08	.14	-.18	.23	-	.43***	.67***	.81***	.33**	.54***
7. MSPSS family (T1)	.05	.08	-.20	-.02	-.33*	.17	-	.45***	.34***	.84***	.43***
8. MSPSS friends (T1)	.16	.04	.00	-.02	-.12	.54***	.58***	-	.60***	.31**	.76***
9. MSPSS-p sig. other (T1)	.02	.08	.19	-.17	.20	.82***	.02	.38**	-	.30**	.54***
10. MSPSS-p family (T1)	-.05	.09	-.09	-.08	-.29	.13	.78***	.44***	.17	-	.50***
11. MSPSS-p friends (T1)	.07	.07	-.02	-.04	-.18	.43**	.48**	.82***	.42**	.58***	-

Note: Correlation matrix for the stressor (n = 90; upper triangle) and non-stressor (n = 53; lower triangle) groups for scores on the Autobiographical Memory Test (AMT), the Attitudes Toward Self (ATS), the Multidimensional Scale of Perceived Social Support (MSPSS), the Multidimensional Scale of Perceived Social Support in Performance (MSPSSp), and age measured at Time 1 (T1), and the AMT and the Impact of Event Scale-Revised (IES-R) measured at Time 2 a month later (T2). ***p < .001, **p < .01, *p < .05.

Figure 1. Scatter plots



Note. Scatter plot of relation between the proportion of specific memories recalled in the Autobiographical Memory Test (AMT) and the degree of perceived performance-related social support given by friends for the stressor (A) and non-stressor (B) groups. Line of best fit and pearson's *r* correlation coefficient are also given.